

CLAIMS:

- 1) A connecting device for a body of semiconductor material including an integrated circuit, the body of semiconductor material including a planar surface with a plurality of clusters, each cluster having a plurality of signal transmissive connector elements arranged on the planar surface in a predetermined disposition, said connecting device comprising:
- a) a plurality of groups of signal transmissive connector members
 - i) each group of signal transmissive connector members being associated with a respective cluster of signal transmissive connector elements,
 - ii) the signal transmissive connector members in each group being arranged according to the disposition of the signal transmissive connector elements in the cluster associated with the group such that each signal transmissive connector member can mate with a corresponding one of the signal transmissive connector element,
 - b) flexible portions between respective groups of signal transmissive connector members;
 - c) each flexible portion including a plurality of signal transmission pathways connecting to respective signal transmissive connector members of a group of signal transmissive connector members;
 - d) the flexible portions having a flexibility allowing the respective groups of signal transmissive connector members to move in a direction parallel to said planar surface with relation to one another

under the effect of thermal expansion of the body of semiconductor material.

- 2) A connecting device as defined in claim 1, wherein said connecting device includes a base element and a plurality of projecting fingers, each finger carrying a respective group of signal transmissive connector members.
- 3) A connecting device as defined in claim 2, wherein each finger includes a flexible portion.
- 4) A connecting device as defined in claim 3, wherein said finger is a flexible printed circuit.
- 5) A connecting device as defined in claim 1, wherein said connecting device comprises an elongated band, said band including a plurality of connector zones in a spaced apart relationship separated from one another by said flexible portions.
- 6) A connecting device as defined in claim 5, wherein each connector zone includes a group of signal transmissive connector members.
- 7) A connecting device as defined in claim 6, wherein said elongated band is a flexible printed circuit.
- 8) A connecting device as defined in claim 1, wherein said connecting device includes a signal-processing element including an integrated circuit formed on a semiconductor chip.
- 9) A connecting device as defined in claim 8, wherein at least one group of signal transmissive connector members are realized on said semiconductor chip.
- 10) In combination:
 - a) a body of semiconductor material including an integrated circuit, the body of semiconductor material including:
 - i) a planar surface with a plurality of clusters, each cluster having a plurality of signal

transmissive connector elements arranged on said planar surface in a predetermined disposition;

b) a connecting device, comprising:

5 i) a plurality of groups of signal transmissive connector members

I) each group of signal transmissive connector members being associated with a respective cluster of signal transmissive connector elements,

10 II) the signal transmissive connector members in each group being arranged according to the disposition of the signal transmissive connector elements in the cluster associated with the group such that each signal
15 transmissive connector member mates with a corresponding one of the signal transmissive connector element,

ii) flexible portions between respective groups of signal transmissive connector members;

20 iii) each flexible portion including a plurality of signal transmission pathways connecting to respective signal transmissive connector members of a group of signal transmissive connector members;

25 iv) the flexible portions having a flexibility allowing the respective groups of signal transmissive connector members to move in a direction parallel to said planar surface with relation to one another under the effect of
30 thermal expansion of the body of semiconductor material.

11) A combination as defined in claim 10, wherein said groups of signal transmissive connector members are coplanar.

- 12) A combination as defined in claim 11, wherein said connecting device includes a base element and a plurality of projecting fingers, each finger carrying a respective group of signal transmissive connector members.
- 13) A combination as defined in claim 12, wherein each finger includes a flexible portion.
- 14) A combination as defined in claim 13, wherein each finger is a flexible printed circuit.
- 15) A combination as defined in claim 14, including a plurality of said connecting devices connected to said body of semiconductor material.
- 16) A combination as defined in claim 14, wherein said integrated circuit includes a plurality of functional modules, wherein each cluster of signal transmissive connector elements belongs to a different functional module.
- 17) A combination as defined in claim 16, wherein said functional modules are arranged on said body of semiconductor material in an array including rows and columns.
- 18) A combination as defined in claim 17, wherein said connecting device connects with clusters of signal transmissive connector elements of functional modules in a single row of said array.
- 19) A combination as defined in claim 18, including a plurality of said connecting devices wherein each connecting device connects with clusters of signal transmissive connector elements of functional modules in a different row of said array.
- 20) A combination as defined in claim 11, wherein said connecting device comprises a plurality of connector zones in a spaced apart relationship connected by flexible portions.

- 21) A combination as defined in claim 20, wherein each connector zone includes a group of signal transmissive connector members.
- 22) A combination as defined in claim 21, wherein said
5 flexible portion is a flexible printed circuit.
- 23) A combination as defined in claim 22, including a plurality of said connecting devices connected to said body of semiconductor material.
- 24) A combination as defined in claim 22, wherein said
10 integrated circuit includes a plurality of functional modules, wherein each cluster of signal transmissive connector elements belongs to a different functional module.
- 25) A combination as defined in claim 24, wherein said
15 functional modules are arranged on said body of semiconductor material in an array including rows and columns.
- 26) A combination as defined in claim 25, wherein said connecting device connects with clusters of signal
20 transmissive connector elements of functional modules in a single row of said array.
- 27) A combination as defined in claim 26, including a plurality of said connecting devices wherein each connecting device connects with clusters of signal
25 transmissive connector elements of functional modules in a different row of said array.
- 28) A combination as defined in claim 10, wherein said connecting device includes a signal processing element implemented by an integrated circuit formed on a
30 semiconductor chip.
- 29) A combination as defined in claim 28, wherein said groups of signal transmissive connector members are realized on said integrated circuit formed on a semiconductor chip.

- 30) A connecting device for a body of semiconductor material including an integrated circuit, the body of semiconductor material including a planar surface having a plurality of optical signal transmissive connector elements arranged on the planar surface in a predetermined disposition, said connecting device comprising:
- a) a plurality of optical signal transmissive connector members
 - 10 i) each optical signal transmissive connector member being associated with a respective optical signal transmissive connector element,
 - ii) the optical signal transmissive connector members being arranged according to the disposition of the optical signal transmissive connector elements such that each optical signal transmissive connector member can communicate optically with a corresponding one of the optical signal transmissive connector elements,
 - 20 b) flexible portions between respective optical signal transmissive connector members;
 - c) each flexible portion including a signal transmission pathway connecting to an optical signal transmissive connector member;
 - 25 d) the flexible portions having a flexibility allowing respective optical signal transmissive connector members to move in a direction parallel to said planar surface with relation to one another under the effect of thermal expansion of the body of semiconductor material.
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- 31) In combination:
- a) a body of semiconductor material including an integrated circuit, the body of semiconductor material including:

- i) a planar surface with a plurality of optical signal transmissive connector elements arranged on said planar surface in a predetermined disposition;
- 5 b) a connecting device, comprising:
 - i) a plurality of optical signal transmissive connector members
 - I) each optical signal transmissive connector member being associated with a respective
10 optical signal transmissive connector element,
 - II) the optical signal transmissive connector members being arranged according to the disposition of the optical signal
15 transmissive connector elements such that each optical signal transmissive connector member communicates optically with a corresponding one of the optical signal transmissive connector elements,
 - 20 ii) flexible portions between respective optical signal transmissive connector members;
 - iii) each flexible portion including a signal transmission pathway connecting to the optical signal transmissive connector member;
 - 25 iv) the flexible portions having a flexibility allowing the optical signal transmissive connector members to move in a direction parallel to said planar surface with relation to one another under the effect of thermal
30 expansion of the body of semiconductor material.